THE PORT OF CORPUS CHRISTI'S PROPOSED DESALINATION FACILITY

I. EXECUTIVE SUMMARY

1. The "Ask"

The goal is to have a full and thorough review by the Environmental Protection Agency (EPA) of the application by the Port of Corpus Christi Authority (Port) for a wastewater discharge permit for a saltwater desalination facility on Harbor Island. Such facility would have devastating environmental impacts to critical aquatic areas along the coast. Therefore, the "ask" is to have EPA undertake a proper full review and evaluation of the permit application pending before the state agency, the Texas Commission on Environmental Quality (TCEQ). Such a full review, which would show that the proposed permit application represents a major permit and not a minor permit, will clearly demonstrate the permit should be denied.

2. The Proposed Facility

The Port operates the largest crude oil exporting port in the United States with an export capacity of 2.2 million barrels per day. The Port now seeks a wastewater discharge permit for a desalination facility to be located on Harbor Island, which sits inside the Redfish Bay State Scientific Area. The proposed facility will discharge nearly 100 million gallons per day of highly saline wastewater directly into the Aransas Pass tidal inlet, an area that has been called "the heart – the engine" of the marine ecosystem for the region—a waterbody that is the most important spawning site or migration route for all of the most economically valuable sport and commercial fin and shell fish in the entire region. It is irreplaceable from an aquatic life standpoint. Many groups have expressed dismay at the Port's proposed plans, including agencies like the Texas Parks and Wildlife Department. According to numerous experts with both the University of Texas and Texas A&M University systems, this location is "the absolute worst location on the Texas coast, from an ecological perspective" for the Port's proposed desalination facility. Moreover, this is the first application for a discharge permit for a large seawater desalination in Region 6, with a number of other such permit applications pending in Texas. The Texas review process requires much less information in the application and a much less comprehensive review of the impacts than is required in the other two regions of EPA issuing such discharge permits (California and Florida).

3. The EPA's Review Authority

The Port's wastewater discharge permit application is pending before the TCEQ. Under the Memorandum of Agreement (MOA) between EPA and TCEQ, the issuance of such permits is handled by the TCEQ, with EPA retaining review and oversight authority over such permits. EPA has waived its review authority in regard to many permits, but retains such authority in regard to certain types of permits.[1] For example, EPA retains review authority over discharges from all designated major facilities.[2] In this case, TCEQ determined the proposed discharge is minor, not major, thus avoiding EPA review. However, the TCEQ's determination is wrong, as using the

[1] See MOA, at 8, Section IV.C.1.

[2] See MOA, at 8, Section IV.C.1.f.

criteria established for such determinations reveals the facility should be classified as "major" and subject to EPA review. EPA should review the application, make its own determination, and notify TCEQ this is a major permit subject to EPA review.

II. DISCUSSION

A. The Port's Proposed Project

Currently pending before the TCEQ, in TCEQ Docket No. 2019-1156-IWD and SOAH Docket No. 582-20-1895, is a permit application by the Port for a wastewater discharge permit for a new saltwater desalination facility to be built on Harbor Island in Nueces County, Texas. The Port proposes to discharge wastewater from the facility directly into the Aransas Inlet, in an area immediately adjacent to the Redfish Bay State Scientific Area.[3]

B. The Port's Proposed Location is Terrible from an Environmental Standpoint

The discharge location is one of the most critically sensitive ecological systems on the Texas coast. In 2018, the Texas Parks and Wildlife Department (TPWD) and the General Land Office (GLO) prepared a report entitled *Marine Seawater Desalination Diversion and Discharge Zones Study* (TPWD/GLO Report). In their own words, GLO and TPWD prepared the report "to identify zones in the Gulf of Mexico that are appropriate for the diversion of marine seawater and for the discharge of marine seawater desalination waste while taking into account the need to protect marine organisms." The TPWD/GLO Report generally designates the entire Texas coast as appropriate for desalination discharge. However, the Report very selectively **excludes the five major passes – including Aransas Pass** – connecting the Gulf of Mexico with Texas bays and estuaries. Thus, the area chosen by the Port for the wastewater discharge is one of only five areas on the Texas coast not found appropriate by the TPWD/GLO Report for desalination activities. Despite this, the Port has pushed ahead in seeking to discharge approximately 100 million gallons per day of wastewater into the inlet.

The Aransas Pass Tidal Inlet has been designated as "Essential Fish Habitat," protected by the Magnuson-Stevens Fishery Conservation and Management Act. Essential Fish Habitat includes all types of aquatic habitat such as wetlands, coral reefs, sand, seagrasses, and rivers.[4] The National Marine Fisheries Service has identified the Aransas Pass, Copano Bay, Aransas Bay, Redfish Bay, Corpus Christi Bay, Ingleside Cove, Nueces Bay, and Laguna Madre as Essential Fish Habitat for redfish and shrimp.[5] Dr. Brad Erisman, a former professor of fisheries ecology and Director of the Coastal Fisheries Research Program at the University of Texas Marine Science Institute, testified that the Aransas Pass Tidal Inlet is the most important, multi-species spawning site for the most economically valuable sportfishes in the entire region. Dr. Greg Stunz, the

[3] The Redfish Bay State Scientific Area contains unique, fragile biological communities including seagrass beds, oyster reefs, marshes and mangroves. Seagrass growing in shallow water provides valuable feeding and nursery habitat and critical refuge for shrimp, crabs and juvenile game fish. Seagrasses also provide food for sea turtles, shorebirds and waterfowl. Wading birds use mangroves and marshes for roosting, feeding and nesting habitat. The habitats in Redfish Bay support commercial and recreational fishing and hunting. All seagrasses in the state scientific area are protected by law.

[4] http://www.habitat.noaa.gov/protection/efh/index.html.

[5] https://www.fisheries.noaa.gov/about-us.

Endowed Chair for Fisheries and Ocean Health and Center for Sportfish Science and Conservation Director at Harte Research Institute,[6] testified that the Aransas Pass Tidal Inlet is akin to a tropical rain forest or a coral reef in terms of ecological importance and biological diversity. This is not just any water body; it is one of the most sensitive, yet productive, waterbodies in the United States.

Dr. Erisman believes the proposed desalination facility presents "a very real threat of serious destructive harm to the marine environment, aquatic life, and wildlife, including fish growth, reproduction, and survival." As Dr. Stunz testified, "If I had to choose the absolute worst location on the Texas coast, from an ecological perspective, to place a desalination plant, I would choose Harbor Island in the Aransas Pass inlet." Dr. Andrew Esbaugh, a professor at University of Texas Marine Science Institute and a physiologist and toxicologist that focuses on the interaction between environmental factors and animal performance,[7] concluded that "[s]imply put, the area where the Port of Corpus Christi seeks to discharge effluent is one of the worst places that could have been chosen on the Texas coast for such an activity.. . . [with] the potential to have devastating and far-reaching consequences to the marine environment and aquatic life, both in the immediate area and beyond."

C. The TCEQ's Review Has Been Minimal and Appears Designed Merely to Get the Permit Approved

1. The TCEQ's Modeling Errors and Cursory Review

So, knowing that a highly sensitive ecological area is involved, did the TCEQ do a heightened analysis to ensure the protection of aquatic life? No, quite the contrary. In 2019, the TCEQ Executive Director prepared a draft permit the TCEQ was ready to issue, but various parties challenged it. TPWD filed a second set of comments, reemphasizing its concerns from its first set in 2018. The Coastal Conservation Association, expressed its opposition as did hundreds of individuals and organizations.

The TCEQ referred the matter for a hearing before two administrative judges. Before the hearing occurred, attorneys for protesting parties took the deposition of TCEQ staff and demonstrated how the modeling used by the Port and reviewed by the TCEQ was wrong, and showed that the discharge would violate the permit. Because of that deposition, the TCEQ simply changed the draft permit, loosening the permit limit to allow about 10 times more salinity at the boundary of the first mixing zone. That is the equivalent of law enforcement raising the speed limit to whatever speed is being driven, rather than setting a speed limit determined to be safe. This bears repeating: the TCEQ staff admitted to making a modeling error that underpinned its antidegradation review and the draft permit limits and, instead of requiring compliance with the pending Draft Permit, simply revised the Draft Permit to allow the dramatically higher predicted salinity concentrations in the receiving waters. This is a surprising action by a regulatory agency charged with protecting the environment. It did not even consult with TPWD, FWS, or EPA on the impacts of such a significant change in its change in permit limits.

[6] Dr. Stunz is also a professor at Texas A&M-Corpus Christi, focusing on fish populations, their interaction with their habitats, and the vital role of the estuaries and near-shore waters.

[7] Dr. Esbaugh has studied comparative physiology for 19 years and has been on faculty at UTMSI since 2012.

In addition to making modeling errors, the TCEQ staff admitted to not really knowing whether the proposed permit would cause harm or not. The TCEQ's biologist testified she was "very uncomfortable" doing the antidegradation review on this application because "of the size of the discharge, the nature of the discharge, the location of the discharge. And looking into the gazing ball and seeing all this playing out." When asked whether the discharge from this facility would kill aquatic life, she responded, "I hope [not]." And, when asked about her antidegradation review, she testified that because of the lack of relevant toxicological criteria and data (especially regarding salinity), it was based on her "feelings." Such speculative evidence is shockingly deficient when the law requires the Port and TCEQ to ensure that there will be no significant mortality to aquatic life from such a facility.

2. The TCEQ Misclassified the Facility

In addition to a mistake-filled review, the TCEQ also misclassified the facility. As part of its review process, TCEQ must determine whether the facility is "minor" or "major" and such classification has various impacts upon the application. One critical impact from the classification is that the EPA retains review authority over discharges from a "major" facility, and TCEQ must provide draft permits for major facilities to the EPA for the opportunity for review and comment. To determine how to categorize a facility, TCEQ uses a worksheet with points attributed for various factors. If a score of 80 or higher is achieved, the facility is classified as major. If the score is below that, then it is classified as minor.

Even the most cursory review of TCEQ's worksheet analysis reflects that TCEQ made obvious errors, resulting in an incorrect classification of the proposed facility as minor, when it should be classified as major. For example, Factor 6 in the worksheet provides for different scoring depending upon whether the discharge is into a National Estuary Protection (NEP) area. The TCEQ determined the discharge was <u>not</u> into a NEP area, yet the NEP Mapping Tool clearly shows the discharge to occur within the Coastal Bend Bays and Estuaries Program which is part of the NEP Program. https://gispub2.epa.gov/NEPmap/index.html. Thus, TCEQ got even this most basic element wrong, resulting in an incorrect scoring for this factor. Proper characterization of the discharge into a NEP area would increase the scoring for Factor 6 by 10 points. This is just one example. A detailed summary of the TCEQ's errors in its worksheet analysis are shown below.

a) <u>Factor 1</u>

For Factor 1, TCEQ determined that "no process wastestreams" would result from the proposed desalination facility. Based on this, TCEQ assigned no points for Factor 1, and this determination also impacted the evaluation of Factor 2. However, according to 40 C.F.R. § 122, process wastewater is defined as "any water which, during manufacturing or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct, or waste product." In this case, the process flow diagram shows that the marine water is mixed with numerous different materials – chlorine, coagulant, flocculent, sodium hypochlorite before the waste water is discharged. Furthermore, the application itself lists sea water as a raw material. Certainly the subsequent waste discharge "results from" the "use of" sea water. Therefore, the production of potable water, with saltwater as the feedstock and the discharged reject brine (containing cleaning products, flocculants, coagulants, etc.) is a "process waste stream." The worksheet instructions say to "determine the Toxicity potential from Appendix A and use the TOTAL toxicity potential column and check one." While Appendix A to

the EPA Rating Worksheet does not list SIC Code "Water Transportation – 4491" (which is the classification used by the Port here), there are two other listings for the category "Water Transportation" and they are SIC Codes 4493 and 4499. Both of these codes list a TOTAL toxicity of "5," which results in a score of 25 for Factor 1. That is the toxicity that should have been used by TCEQ. Instead, TCEQ used a toxicity score of "1," resulting in a score of 0 for Factor 1. Thus, had TCEQ properly evaluated Factor 1, it would have assigned 25 points instead of 0 to this factor.

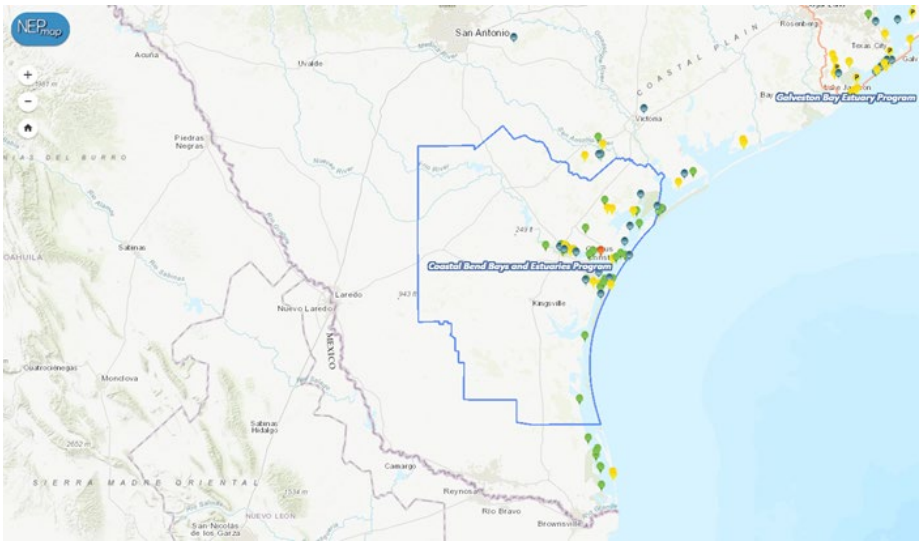
b) Factor 2

In evaluating Factor 2, the scoring is determined by looking at volume and type of wastewater. TCEQ characterized the proposed waste stream as "Type III," which is defined as "other wastewaters include boiler blowdown, blowdown from cooling towers and recirculating cooling systems, sanitary wastewater, and uncontaminated surface runoff." Type III does not include process wastestreams which, as shown above in regard to Factor 1, the wastewater will be in this case. Process wastestreams are included in "Type II" waste water. Type II wastewaters are scored as 30 points under Factor 2, while Type III wastewaters are scored as 50 points. Thus, in addition to being given 25 points under Factor 1 for being a process wastestream, Factor 2 scoring would increase from 30 points to 50 points for a process wastestream. Therefore, the failure by TCEQ to correctly identify the wastewaters are process wastestreams resulted in a total underscoring of Factors 1 and 2 by a total of 45 points.

c) Factor 6

Further, by failing to recognize that the proposed discharge contains process wastewater, TCEQ applied a multiplication factor of 0.15 to the "Headquarters Priority Permit Indicator" (HPRI) score of 30, instead of the 1.0 factor that should be applied to a discharge of more than 10 million gallons per day containing process wastewater. Applying the correct multiplication factor of 1.0 rather than 0.15 causes this portion of the Factor 6 score to go from 4.5 to 30.

Moreover, as noted above, the NEP Mapping Tool clearly shows the discharge to occur within the Coastal Bend Bays and Estuaries Program which is part of the NEP Program. https://gispub2.epa.gov/NEPmap/index.html. This increases the scoring for Factor 6 by 10 points.



d) Chart of Errors and Corrections

In total, the TCEQ scoring errors in the Major/Minor classification worksheet caused the TCEQ to incorrectly classify this facility as minor, when it should be classified as major. The chart below demonstrates the changes discussed above.

	Current TCEQ Worksheet	Correct Worksheet Analysis
Factor 1	0	25
Factor 2	30	50
Factor 3	0	0
Factor 4	0	0
Factor 5	10	10
Factor 6	4.5	40
Total: (Major Permit if over 80 points)	**44.5**	**125**

As seen by the chart above, the correct scoring of the facility would cause it to be over 80 points, thus classifying it as major and subjecting the draft permit to EPA review.

D. The Facility Will Be Potentially Devastating to the Aquatic Environment

The main constituent of concern from the proposed facility is salinity. The desalination facility will remove the salts from the produced water and discharge the salts in high concentrations into the Aransas Inlet. High salinity or saline imbalances can be fatal to aquatic life. As Scott Holt testified, "high salinity sucks the water out of larvae." Dr. Andrew Esbaugh further explained "[w]ater inherently moves to higher concentrations of salt." If the ambient water in the Aransas Pass has a higher concentration of salt than the water inside the animal, "the water that's inside of a fish is going to move outside of the fish, effectively dehydrating it." "So when you're looking at the impacts on larval fish, it's all about the water getting sucked out of the animal and the animal not having enough time or ability to counteract it by drinking water, processing that water, and excreting salt."

As Dr. Esbaugh noted, it is critical to keep salinity balanced for early stage aquatic life: "When we're transporting embryos from Texas Parks & Wildlife to my lab . . . we refuse to use our own water . . . We take their water. . . . when salinities aren't matched, embryos can sink or swell with water sometimes or they can blow up . . . We see major drops in our survival when we didn't match salinity." Scott Holt testified that the "issue here is the very high concentration of [salt] in a small place." While estuarine organisms can tolerate significant changes in salinities and temperatures as they migrate, larval stages cannot. Such sharp or sudden change are clearly going to occur in the brine discharge mixing zones for the proposed discharge. The aquatic life experts all opined that the discharged wastewater, in the volumes proposed in the draft permit, will result in the deaths of significant amounts of larvae in the Aransas Inlet on the journey to the nursery grounds in Corpus Christi Bay and surrounding estuaries.

The evidence in the hearing record indicates the salinity levels in the receiving waters resulting from the discharge will be much higher than predicted by the Port and TCEQ. That continues to be true, as the new application has a major error in its modeling of the salinity levels.[8] These higher salinity levels are of major concern, as billions of larvae will travel through the mixing zones. When the larvae are pushed by tidal currents through Aransas Pass and into the brine discharge plume, they will instantaneously go from an ambient salinity level into much higher condition. Dr. Greg Stunz, one of PAC's experts, explained these concerns well, when he testified, "As an analogy, if a human being is transported directly from sea level to the top of Mt. Everest, the change in altitude and lack of oxygen would likely cause mortality." Numerous aquatic experts testified the same is likely to occur with the fish larvae in the mixing zones of the discharge. Dr. Stunz was unequivocal in testifying the discharge from desalination will kill perhaps millions of marine organisms: "Even with conservative calculations, the elevated salinity has the potential to result in mortality for literally millions of larvae and nekton during peak recruitment season." The discharge of nearly 100 million gallons per day will be permitted to occur 24 hours per day, seven days per week, and can last for years. Thus, it is easy to understand the aquatic experts' alarm and view of this permit as disastrous to the local ecology.

In addition to being living organisms entitled to protection, the larvae also represent a very ecologically important food base that would be unavailable for other marine life should their migration be impaired, and such can create a ripple effect. Thus, it is not just larvae and other early stages of fin fish and shellfish that are at risk from the discharge. Even birds could be affected, as Dr. Stunz testified the crabs, shrimp, and fish in the Aransas Pass tidal inlet provide an important food supply for birds, including whooping cranes. "[I]t's not just about what's living in the water." He expects the discharge will cause "extraordinarily high mortality for various forms of marine life in the channel." Among other things, higher salinities are associated with higher occurrence of harmful algae blooms, such as red tide, which is harmful to aquatic life and kills fish.

E. Two Independent Judges Recommended Denial of the Permit

After a weeklong hearing before two independent Administrative Law Judges, those judges acknowledged the potential harm from the proposed facility and recommended that the permit be denied. The judges agreed with the protesting parties and aquatic life experts on six of nine issues referred for consideration by the TCEQ. Not just one or two issues, but on six of the nine referred issues the judges found against the Port. After the judges issued their decision, the TCEQ's Executive Director flipped his position and agreed that the permit could not be issued—**despite having supported issuance of the permit all through the hearing process up to that point**! But, rather than agreeing with the judges that the permit should be denied, the TCEQ's Executive Director recommended that the permit be sent back to the judges so the Port could address the

[8] TCEQ is relying on the CORMIX model, for which the official user's manual states is not appropriate for conditions at the outfall, such as the 90 foot hole and existence of eddies. Moreover, the manual states:

> In setting requirements for mixing zones, EPA requires that "the area or volume of an individual zone or group of zones be limited to an area or volume as small as practicable that will not interfere with the designated uses or with the established community of aquatic life in the segment for which the uses are designated," and the shape be "a simple configuration that is easy to locate in the body of water and avoids impingement on biologically important areas." Citing USEPA Technical Guidance Manual for the Regulations Promulgated Pursuant to Section 301 (g) of the Clean Water Act of 1977, Washington, D.C. August 1984.

problems with the proposed permit. This was now the third bite at the apple for the Port, again demonstrating the TCEQ's efforts to help the Port get its permit, rather than serving as a truly independent regulatory agency attempting to protect the environment.

F. The Current Status of the Permit Application

Despite two independent judges recommending denial of the permit, the TCEQ Commissioners accepted the recommendation of TCEQ staff and remanded the case back to the judges to give the Port an additional opportunity to provide more information and modeling related to water conditions at the site of the proposed discharge. Rather than providing the information requested by the TCEQ Commissioners, the Port moved the discharge location and provided its analysis for the new location. The Port also provided an entirely new design for the outfall, which in fact, creates larger impacts on marine species due to the higher salinity levels to which marine species will be exposed and to discharge velocities which would increase from 1.4 meters per second to 8.2 meters per second, right where fish spawn and larvae migrate to their nursery grounds. Therefore, the Port's changes <u>are actually worse for environmental impacts and do nothing to cure the harm from its original proposal.</u>

The TCEQ's Executive Director should have opposed the Port's change in location of the discharge point, as that was outside of the Commissioners' order of remand. Moreover, the TCEQ's own staff witness had previously testified that moving the discharge location was like submitting a new application. Specifically, TCEQ witness Shannon Gibson was asked about the impact of moving the location of the discharge and, in response, she testified:

> **"**I believe that would require a whole new application. I would need to double-check. But because our reviews are site specific, if they move the outfall, that would, basically, be going back to the beginning."

Ms. Gibson is right, changing the discharge location is equivalent to submitting an entirely new application. The relevant bathymetry, the site-specific characteristics, and the potential impacts from the discharge may vary significantly based upon the discharge location. The mixing zones for environmental impacts are determined based on the discharge location. However, despite the testimony of TCEQ's own staff, the TCEQ did not go back to the beginning and conduct a new evaluation of the permit based on the opportunity for comments by TPWD and the public. So, now we are in a situation where the judges will hold an additional hearing on the permit sometime in the coming months and make a recommendation back to the TCEQ Commissioners on the permit. The EPA should weigh in and address the improper classification of the proposed facility and the insufficient manner in which the TCEQ has processed this permit application to date.

V. CONCLUSION

In conclusion, the EPA should review this permit application proceeding, review the improper handling of the application to date by the TCEQ, and advise the TCEQ that the EPA considers this a major permit that is subject to EPA review. Further, if the proper review is done by the EPA, it will be obvious this permit must be denied as it is not consistent with the applicable water quality standards and will be potentially disastrous to aquatic life in the Aransas Inlet and beyond.